280D Néo Series

Streaming DSD DAC

DSD
Direct Stream Digital

apt X
CSR

DXD
Digital eXtreme Definition

Owner's Manual

MOON
by SIMAUDIO

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves or another apparatus that produces heat.
9. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for safety. If the provided plug does not fit into the outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus. Unplug mains cord during transportation.
11. Only use attachments and accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power cord or plug has been damaged; liquid has been spilled or objects have fallen into the apparatus; or the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. No naked flame sources, such as candles, should be placed on the apparatus.

WARNING:
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

FCC information for **MOON 280D** Digital-to-Analog Converters equipped with the **aptX Bluetooth** module and **MiND** Music Streamer module:

This unit contains Transmitter Module FCC ID : SSSBC127-X and Transmitter Module FCC ID : ZUCSEDMP3. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Important Safety Instructions (cont'd)

The lightning flash with the arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Marking by the "CE" symbol (shown left) indicates compliance of this device with the EMC (Electromagnetic Compatibility) and LVD (Low Voltage Directive) standards of the European Community

Please read all instructions and precautions carefully and completely before operating your Nēo 280D D/A Converter

1. **ALWAYS** disconnect your entire system from the AC mains before connecting or disconnecting any cables, or when cleaning any component. To completely disconnect this apparatus from the AC mains, disconnect the power supply cord plug from the AC receptacle.
2. The Nēo 280D must be terminated with a three-conductor AC mains power cord which includes an earth ground connection. To prevent shock hazard, all three connections must **ALWAYS** be used. Connect the Nēo 280D only to an AC source of the proper voltage; Both the shipping box and rear panel serial number label will indicate the correct voltage. Use of any other voltage will likely damage the unit and void the warranty
3. AC extension cords are **NOT** recommended for use with this product. The mains plug of the power supply cord shall remain readily accessible.
4. **NEVER** use flammable or combustible chemicals for cleaning audio components.
5. **NEVER** operate the Nēo 280D with any covers removed. There are no user-serviceable parts inside. An open unit, especially if it is still connected to an AC source, presents a potentially lethal shock hazard. Refer all questions to authorized service personnel only.
6. **NEVER** wet the inside of the Nēo 280D with any liquid. If a liquid substance does enter your Nēo 280D, immediately disconnect it from the AC mains and take it to your MOON dealer for a complete check-up.
7. **NEVER** spill or pour liquids directly onto the Nēo 280D.
8. **NEVER** block air flow through ventilation slots or heatsinks.
9. **NEVER** bypass any fuse.
10. **NEVER** replace any fuse with a value or type other than those specified
11. **NEVER** attempt to repair the Nēo 280D. If a problem occurs contact your MOON dealer.
12. **NEVER** expose the Nēo 280D to extremely high or low temperatures.
13. **NEVER** operate the Nēo 280D in an explosive atmosphere.
14. **ALWAYS** keep electrical equipment out of reach of children.
15. **ALWAYS** unplug sensitive electronic equipment during lightning storms.
16. **WARNING:** Do not expose batteries or battery pack to excessive heat such as sunshine, or fire or the like.

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Date Code: 20151021

Introduction

Thank you for selecting the **MOON Nēo 280D** Digital-to-Analog Converter (DAC) as a part of your music/cinema system. This component has been designed to offer state-of-the-art high-end performance in an elegant package, while retaining all the sonic hallmarks on which Simaudio has made its reputation. We have spared no effort to ensure that it is amongst ***the finest*** DAC's available in its class. We have been building high-performance audio equipment for over 30 years, and the know-how gained through our cumulative experience is an important reason why **MOON** DACs are so musically satisfying.

The performance of your **Nēo 280D** will continue to improve during the first 400 hours of listening. This is the result of a "break-in" period required for the numerous high quality electronic parts used throughout this DAC.

Before setting up your new **280D**, we encourage you to please read this manual thoroughly to properly acquaint yourself with its features. We hope you enjoy listening to the **Nēo 280D** DAC as much as the pride we have taken in creating this fine audio product. We understand the power and emotion of music and build our products with the goal of faithfully capturing these elusive qualities.

The information contained in this manual is subject to change without notice. The most current version of this manual is available on our official website at http://www.simaudio.com

Your **Nēo 280D** Digital-to-Analog Converter incorporates many significant design features to achieve its "world class" level of performance. This is an abbreviated list of the more important features:

Fully asynchronous DAC supports native DSD64, DSD128 and DSD256 (USB only) and PCM up to 32-bit/384kHz including DXD (USB only)

Digital Audio Signal Processing using **M-AJiC32** (MOON Asynchronous Jitter Control in 32-bit mode)

Seven (7) digital inputs (AES/EBU x 1, S/PDIF x 2, TosLink x 2, USB x 1 and Bluetooth) allowing for a connection to virtually any digital source.

aptX® support allows for better quality audio over Bluetooth

Front panel LED indicators for (i) input signal PCM sampling rate & DSD rate and (ii) the active input

Optional "**MiND"** (MOON intelligent Network Device) module (8th input) via WiFi or Ethernet input for multi-room streaming.

Optional **MiND** module includes TIDAL Music Service.

DSD Streaming via USB input and over ethernet with *optional* **MiND** module.

The analog stage is a **fully balanced differential** circuit for increased dynamic range and headroom, higher resolution, as well as improved signal-to-noise ratio

EuP compatible eco-friendly power (less than 0.5W) in standby mode with defeatable 20 minutes inactivity "auto shut off"

RS-232 port for (i) full unsolicited bidirectional feedback and (ii) firmware updates; **12 Volt trigger** output for remote operation; **IR input** for external control with aftermarket infrared remote control receivers and **SimLink**™ controller ports that allow for 2-way communications between other MOON components.

4-layer printed circuit boards with pure copper tracings for a much shorter signal path; This results in greater sonic accuracy and a dramatically improved signal-to-noise ratio

Rigid chassis construction to minimize the effects of external vibrations.

Designed to be **powered up at all times** for optimal performance.

Unpacking

The **Nēo 280D** should be removed from its box with care.

The following accessories should be included inside the box with your Digital-to-Analog Converter:

- ✓ *AC power cable*
- ✓ *'CRM-2' remote control with two 'AA' batteries*
- ✓ *'SimLink™' cable with 1/8" mini plug terminations on each end*
- ✓ *Wi-Fi antenna for "**MiND"** Music Streamer equipped version of the Nēo 280D*
- ✓ *This owner's manual*
- ✓ *Warranty and product registration information (USA and Canada only)*

Once the **Nēo 280D** is unpacked, inspect it thoroughly and report any damage to your dealer immediately. We suggest that you keep all of the original packaging, storing it in a safe, dry place in case you're required to transport this product. The customized packaging is specially designed to protect the **280D** from any potential damage during transit.

Please write the serial number of your new **Nēo 280D** in the space provided below for future reference.

Serial Number _____

Installation & Placement

The **Nēo 280D** requires only minimal ventilation to maintain an optimum and consistent operating temperature. However, you should avoid placing it near a heat source as this could compromise the Digital-to-Analog Converter's performance and reliability. As well, it should be placed on a solid level surface. The **280D** uses toroidal transformers; even though they are well shielded, you should not place the Digital-to-Analog Converter too close to source components sensitive to EMI, such as a turntables.

In the event that your **Nēo 280D** is equipped with the "**MiND**" Music Streamer option and you intend to use its wireless streaming feature (between your wireless router and your **280D**), you must install the included Wi-Fi antenna on the back panel by screwing it into the socket labelled "WIFI ANT".

For Nēo 280D's equipped with the optional "MiND" Music Streamer, please visit our website to download PDF versions of both the "MiND Setup Guide" and "MiND App User Guide".

If you intend to use the Nēo 280D's USB input connection (PCM or DSD) with a Windows-based computer, you will need to install our USB HD DSD driver, which can be downloaded from the support section of our website.

<u>Note:</u> Apple-based computers don't require this driver.

Front Panel Controls

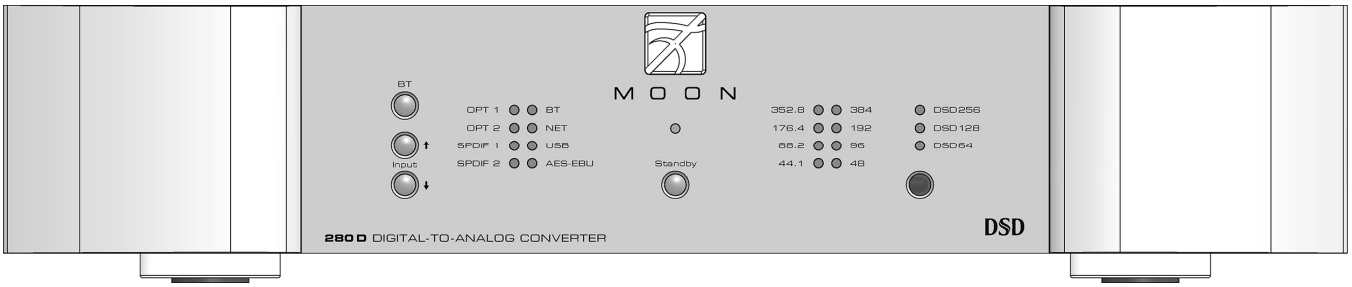

Figure 1: Nēo 280D Front panel

The front panel will look similar to Figure 1 (above). The "Standby" button disengages all internal circuitry from the power supply. When switching back from "Standby" to the "on" mode, the selected 'input' will be memorized from the previous listening session. The blue indicator LED turns off when the **280D** is in "Standby" mode.

The button labeled "BT" activates and deactivates the Bluetooth discovery mode. When the **Nēo 280D** is in discovery mode, you can pair a smart device (iPhone, iPad, Android, etc.) to the **280D**. To begin, press the "BT" button and the corresponding "BT" LED will begin to blink continuously until pairing between your smart device and the **280D** is successful or the 30 second time limit has been exceeded. When "MOON 280D…" appears in the Bluetooth device list of your smart device, simply select it; the "BT" LED will stop blinking to confirm that pairing is successful. This procedure only needs to be performed once for each smart device.

The two (2) buttons labeled "↓ Input ↑" allow you to sequentially scroll, either forward "↓" or backward "↑" through all of the digital inputs. These inputs are ordered as follows going forward (↓): "OPT1", "OPT2", "SPDIF1" , "SPDIF2" , "BT" (Bluetooth) , "NET" (optional MiND network player), "USB" and "AES-EBU". There are eight (8) corresponding red LED's to the right of these input buttons, indicating the currently selected input.

The **Nēo 280D** is capable of processing a PCM digital signal at one of the following eight (8) different sampling rates: "44.1", "48.0", "88.2", "96.0" , "176.4" , "192.0" , "352.8" and "384.0" (all in kHz) or a DSD digital signal at one of the following three (3) data rates DSD64 (2.82MHz), DSD128 (5.64MHz) and DSD256 (11.28MHz); There are eleven (11) LED's on the right side of the faceplate that indicate the PCM sampling rate or DSD data rate of the source material currently being played.

The **Nēo 280D** is ***E**nergy **U**sing **P**roduct (EuP)* compatible. This is a European standard that effectively limits the off and standby power consumption to no more than 0.5W. When the *EuP* function is active, the unit will automatically turn off after 20 minutes of inactivity. The "BT" button allows you to activate and de-activate the *EuP* function as follows; press and hold the "BT" button for approximately 3 seconds to toggle *EuP* on (default setting) or off. The blue "Standby" LED will blink twice when the EuP mode has been turned off and will blink four times when the EuP mode has been turned on. The *EuP* setting is maintained when the **280D** is both powered down and placed into "Standby" mode. *Finally, if you have the MiND option installed in your **Nēo 280D**, the EuP mode will be permanently disabled.*

Notes: (i) DSD format signals can ONLY be played through the USB input. (ii) PCM format signals with sample-rates of 352.8kHz and 384kHz can ONLY be played through the USB input. (iii) you cannot connect a USB flash drive or external hard drive to the "USB" input.

If your **Nēo 280D** is equipped with the optional "MiND" network streaming module, the assigned input is "NET", and the corresponding sampling rate LED will illuminate, as it does for all other inputs.

Rear Panel Connections

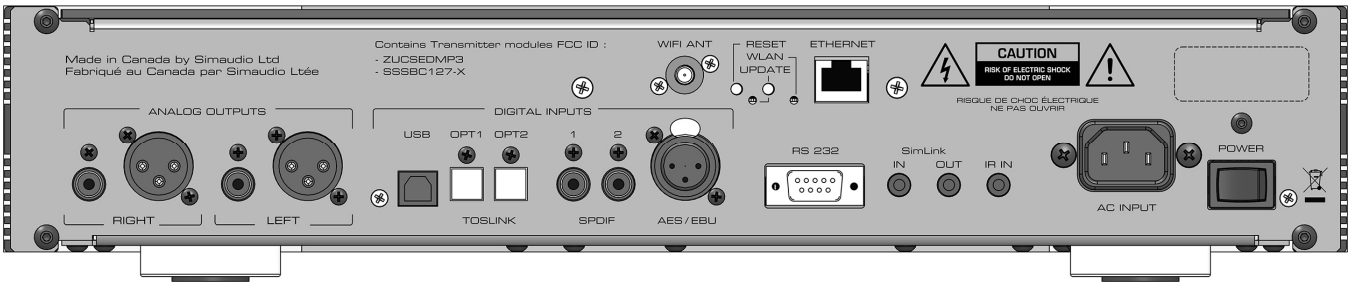

Figure 2: Nēo 280D Rear panel

The rear panel will look similar to Figure 2 (above). On the left side are two pairs of analog outputs; Labeled "Right" and "Left", each with a single-ended RCA and balanced XLR connector. These are "Fixed Level" outputs, intended to be connected to a line-level input on either your preamplifier or integrated amplifier. We strongly recommend that you use the balanced XLR connectors to maximize performance. Don't hesitate to use high quality interconnect cables*****. Poor quality interconnect cables can degrade the overall sonic performance of your system.

There are six (6) "Digital Inputs" as follows: "USB" using a type-B USB connector; two (2) optical inputs using Toslink connectors labelled "OPT1" and "OPT2"; two (2) S/PDIF inputs on RCA connectors which will benefit most from cables with an impedance of 75Ω; and finally a 3-pin XLR connector for an AES/EBU input which will benefit most from a cable with an impedance of 110Ω. All of these inputs correspond to the front panel LED input indicators. Don't hesitate to use high quality digital interconnect cables*****.

The space above and to the right of the row of digital inputs is reserved for the optional " MiND" Music Streamer. If your **Nēo 280D** is equipped with the "MiND" option, you will see a socket for a WiFi antenna and a RJ45 ethernet connector socket. Please consult the "MiND Setup Guide" and "MiND User Guide" for further details.

The right side of the rear panel has various connectors for external communications. The **Nēo 280D** is equipped with full-function bi-directional RS-232 port control and status for custom integration or automation, as well as future software updates. Next to the RS-232 port are two (2) "SimLink™" connectors labeled "in" and "out" on 1/8" mini jacks. Please refer to the next section entitled SimLink™ for more details. Then there is a 1/8" mini-jack input for use with aftermarket infrared remote control receivers.

On the far right side is the main power switch ("0"=off, "1"=on) and the IEC receptacle, labeled "AC Input" for the included AC power cord. Connect the supplied AC power cable to the IEC receptacle. Ensure that the AC wall outlet you use has a functioning ground. For the best sonic performance, it is preferable that you plug your **280D** directly into a dedicated AC outlet and avoid using an extension cord.

***** Please speak with your MOON Authorized Retailer about the benefits of high quality cables for your system, and superior quality AC wall outlet.

SimLink™

The main feature of SimLink™ on the **Nēo 280D**, involves the "Standby" function. By pressing down and holding the "Standby" button for 2 seconds on the **280D**, all other **MOON** components connected via the SimLink will go into "Standby" mode along with the **280D.** The same logic applies when switching from "Standby" to active mode. However, if your **Nēo 280D** is equipped with the "MiND" Music Streamer, then the SimLink™ offers many more features:, Mute, Standby, Digital input selection, and Volume adjustments (with MOON preamplifiers and integrated amplifiers) all via the "MiND" app running on your Apple device.

If you are using an external "MiND" Music Streamer with your **280D** you should make a SimLink™ connection between the "MiND"s SimLink™ out and the **280D**'s SimLink™ in. When you press the ▶ (play) button on the "MiND" App, the **280D** will automatically switch to the "SPDIF 1" input. You can change the default for the "MiND" as follows: Select the input that you want as the new default for "MiND", then press and hold the **INPUT** ↓ (down) button for approximately 3 seconds; the corresponding input LED. will blink two (2) times.

If you are using a MOON CD Transport or CD Player with your **280D** you should make a SimLink™ connection between the "CD"s SimLink™ out and the **280D**'s SimLink™ in. The default input is the "AES/EBU" which means that when you press the ▶ (play) button on the CD, the **280D** will automatically switch to the "AES/EBU" input. You can change the default for the "CD" as follows: Select the input that you want as the new default for "CD", then press and hold the **INPUT** ↑ (up) button for approximately 3 seconds; the corresponding input LED. will blink two (2) times.

The connection rules for the SimLink™ are very straightforward. You must always connect the supplied cable between one component's "SimLink™ Out" jack and another component's "SimLink™ In" jack. There is no master component in a SimLink™ chain; no one particular component operates as the main communications controller. If you are using your **Nēo 280D** with an older MOON product such as a P-7, P-8 or i-7, you will need to update the software of the older product to allow for complete SimLink™ functionality. Contact your retailer for further details.

Operating the 280D

We recommend leaving your **Nēo 280D** powered up at all times to maintain optimal performance. When you plan on being away for a few days, it may not be a bad idea to power off your DAC.

Turning on your Nēo 280D for the first time

Prior to turning the DAC on for the first time, make sure that every cable is properly connected to avoid any problems. Flick the main rocker switch, located on the rear panel, labeled "POWER" to the '1' (on) position. Next, briefly press the push button labeled "Standby" located on the front panel. You will hear a very faint click sound confirming that everything is in order. The blue LED on the front panel will illuminate, indicating that the **280D** is now powered up and ready for use.

On and Off Sequence

To avoid having any annoying noises (ie. "thumps" and "pops") emanate from your speakers when powering your **280D** on or off, you should always power up your **280D** before powering up your preamplifier, integrated amplifier or power amplifier**.** As well, always power down your **280D** after powering down your preamplifier, integrated amplifier or power amplifier.

Balanced Operation

When using an unbalanced interconnect, the audio signal runs through both the center wire and the shield/ground wire. Any noise picked up by this interconnect (ie. nearby magnetic fields such as an AC power cord) will be reproduced by both the preamplifier and amplifier, then heard through the loudspeakers. Conversely, a balanced interconnect has three separate conductors; one for the ground and two for the actual signal. These two signals are identical except that one is 180 degrees out of phase with the other. For example, when one conductor is carrying a signal of +2 Volts, the other will be carrying a signal of –2 Volts. When these two inverted signals on a balanced line are output from the **Nēo 280D**, any noise picked up by the interconnect will be eliminated since a differential circuit amplifies only the difference between these two signals: Noise on a balanced interconnect will be equal on both conductors and therefore cancel out.

Remote Control Operation

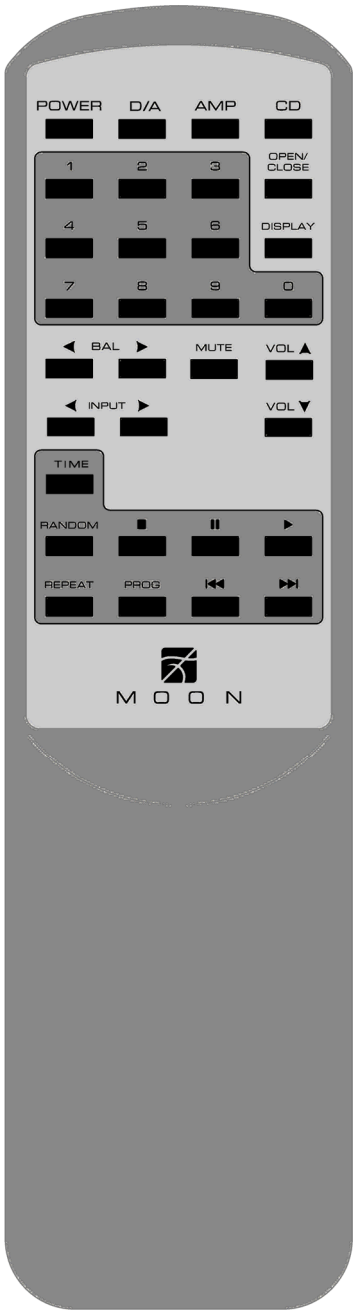

Figure 3: CRM-2 Remote Control

The **Nēo 280D** Digital-to-Analog Converter uses the **'CRM-2'** full-function remote control (figure 6). It operates on the Philips RC-5 communication protocol and is can be used with other MOON components.

The **'CRM-2'** remote uses two AA batteries (included). To install them, simply slide the back plate off in the direction of the arrow; insert the batteries in the correct direction and then replace the back plate.

To engage the **'CRM-2'** remote for use with the **Nēo 280D**, you must first press the button labeled **D/A**.

The **POWER** button located on the upper left will switch the Digital-to-Analog Converter to either 'Standby' or 'On' mode.

The 2 buttons labelled ◄ **INPUT** ► allow you to sequentially scroll, either backwards or forwards, through all available inputs. For example, to switch from "SPDIF 2" to "OPT 1" you may press either ◄ **INPUT** three (3) times or **INPUT** ► five (5) times. Pressing and holding down either of these buttons results in only a single change to the selected input.

The **MUTE** button turns off the output volume. Pressing the "Mute" button a second time will reinstate the output volume level back to its current setting.

When your selected input is "BT" (Bluetooth) and you have a paired smart device (iPhone, iPad, Android, etc.) that is playing music, you may be able to use the ⏸ (pause), ▶ (play) ⏮ (forward) and ⏭ (backward) buttons on the **CRM-2** remote control to navigate the music stored on your smart device. This is dependant on both the App and the smart device, as there may be compatibility issues.

NOTE: The buttons labelled ◄**BAL**► don't affect the operation of the **280D**.

Remote operation with multiple MOON components

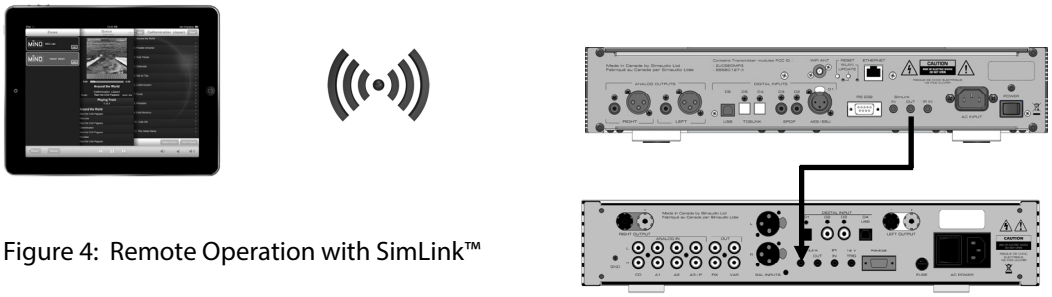

Figure 4: Remote Operation with SimLink™

In figure 4 we have a **Nēo 280D** (with the MiND option installed) connected to a **Nēo 340i** Integrated Amplifier via their respective SimLink™ ports (using a 1/8" mini-jack cable). When you launch the MiND App on your Apple smart device and select this system's ZONE, the **280D** and **340i** will both turn on. As well, the **280D** will automatically switch to the MiND input. To shut down the system, press "Off" for this ZONE in the MiND app.

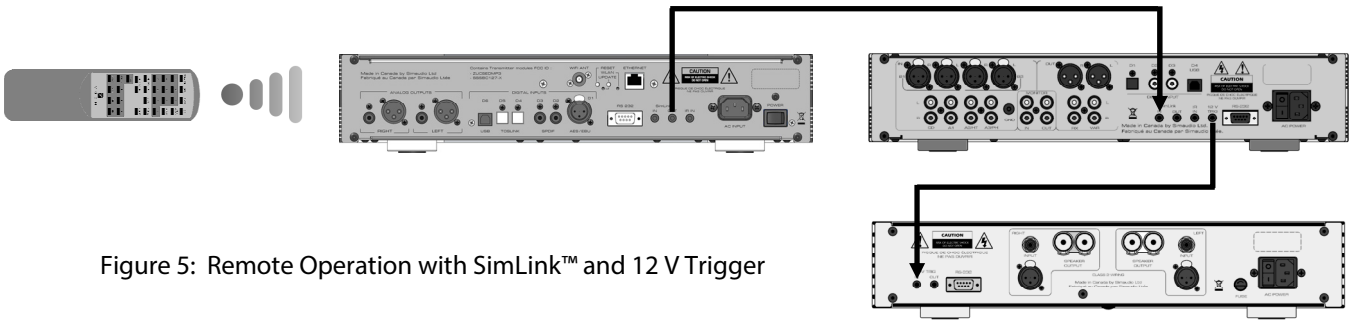

Figure 5: Remote Operation with SimLink™ and 12 V Trigger

In figure 5 we have a **Nēo 280D** DAC connected to a **Nēo 350P** Preamplifier via their respective SimLink™ ports (using a 1/8" mini-jack cable), and the **350P** is connected to a **Nēo 330A** Amplifier via their respective 12V triggers (also using a 1/8" mini-jack cable). When you turn on the **280D** via remote control or by pressing & holding its Standby button, both the **350P** and **330A** will turn on automatically. The same rule applies when you put the **280D** into Standby mode.

Specifications

Configuration	Balanced Differential
Digital Filter / Digital-to-Analog Converters	Fully asynchronous 32-bit
Frequency Response (full range)	2Hz - 100kHz +0/-3dB
THD @1kHz, 0dBFS (A-weighted)	0.001%
Intermodulation Distortion	0.002%
Dynamic Range	120dB
Signal-to-noise Ratio	118dB @ full output
Channel Separation	116dB
Intrinsic Jitter	1 picosecond RMS 32-bit
Analog Outputs – Balanced	1 pair XLR – Fixed Level
Analog Outputs – Single Ended	1 pair RCA – Fixed Leve
Analog Output @ 0dBFS - XLR / RCA	2.0 Volts – Fixed Level
Analog Output Impedance - XLR / RCA	100Ω
DSD Data Rates	(2.8224MHz), Double (5.6448MHz) & Quadruple (11.2896)
DSD Sample Rates	DSD 64, DSD 128 & DSD256 **via USB only**
PCM Bit-depth range	16 - 32 bits (32-bit via USB only)
PCM Sampling Frequency Rates	44.1 - 384kHz (352.8 & 384kHz **via USB only**)
Digital Inputs (7)	1 x AES/EBU , 2 x S/PDIF, 2 x TosLink, 1 x USB, 1 x Bluetooth
Remote Control	Full-Function CRM-2
Power Consumption @ idle	10 watts
AC Power Requirements	120V / 60Hz or 240V / 50Hz
Shipping Weight	16 lbs / 7.5 Kgs
Dimensions (W x H x D, inches / cm)	16.9 x 3.4 x 13.1 / 42.9 x 8.6 x 33.3

Specifications (cont'd)

Balanced Pin Assignment:

Pin 1	Ground
Pin 2	Positive
Pin 3	Negative

Optional MiND Music Streamer:

Signal Input – Wired	100Base-T RJ45 Ethernet interface
Signal Input – Wireless	IEEE 802.11 b/g/n Wi-Fi interface

NOTE: If you require the RS-232 codes for your **Nēo 280D**, please visit the "Contact Us" page and complete the "Information request" form on our website at www.simaudio.com.

Fuse Replacements:

F1 : 120V version uses a 0.2A slow blow (5 x 20mm).
F1 : 230V version uses a 0.1A slow blow (5 x 20mm).
F2 All versions use 0.5A slow blow (5 x 20mm size)